AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended) A method for controlling ~~a sound~~ an acoustic field reproduction unit ~~(2)~~ comprising a plurality of reproduction, ~~elements (3$_n$) using a plurality of sound data input signals (SI) each associated with a predetermined general reproduction direction defined relative to a given point (5) in space, in order to obtain a reproduced sound field of specific characteristics that are substantially independent of the intrinsic reproduction characteristics of the unit (2), characterized in that it comprises~~ comprising:

- determining via a computer parameters describing the reproduction direction of each channel of a multi-channel audio signal,

~~- a step (10) for~~ determining via a computer at least spatial characteristics of the reproduction unit ~~(2)~~, ~~permitting the determination of parameters that are representative, in the case of at least one element (3$_n$) of the reproduction unit (2), of its position~~ the spatial characteristics comprising at least the direction of each reproduction element in the three spatial dimensions relative to the given point, ~~(5)~~.

wherein the determined directions of the reproduction elements are different from the reproduction directions of the multi-channel audio signal,

~~- a step (50) for~~ determining via a computer a spatial adaptation matrix using the determined directions of the reproduction elements and the parameters describing the reproduction directions, ~~filters (A) using the at least spatial characteristics of the reproduction unit (2) and the predetermined general reproduction directions associated with the plurality of sound data input signals (SI);~~

~~- a step (70) for determining at least one signal for controlling the elements of the reproduction unit by applying the adaptation filters to the plurality of sound data input signals (SI); and~~

~~- a step for providing the at least one control signal with a view to application to the reproduction elements (3„)~~

wherein the spatial adaptation matrix is determined such that controlling the reproduction elements with the controlling signals reproduces, in a region comprising the given point, the acoustic field that would have been obtained by controlling, with the multi-channel audio signal, ideal reproduction elements which would exactly comply with the reproduction directions of the multi-channel audio signal.

2. (currently amended) The ~~A~~ method according to claim 1, ~~characterized in that~~ wherein ~~step (10) for~~ the determining at least spatial characteristics of the reproduction unit ~~(2)~~ comprises an acquisition sub-step ~~(20)~~ enabling all or some of the characteristics of the reproduction unit ~~(2)~~ to be determined.

3. (currently amended) The ~~A~~ method according to claim 1, ~~characterized in that~~ wherein the ~~step (10) for~~ determining at least spatial characteristics of the reproduction unit ~~(2)~~ comprises a calibration step ~~(30)~~ enabling all or some of the characteristics of the reproduction unit ~~(2)~~ to be provided.

4. (currently amended) The ~~A~~ method according to claim 3, ~~characterized in that~~ wherein the calibration sub-step ~~(30)~~ comprises, in the case of at least one of the reproduction elements ~~(3_n)~~:

- a sub-step ~~(32)~~ for transmitting a specific signal ($u_n(t)$) to the at least one element ~~(3_n)~~ of the reproduction unit ~~(2)~~;

- a sub-step ~~(34)~~ for acquiring the sound wave emitted in response by the at least one element ~~(3_n)~~;

- a sub-step ~~(36)~~ for converting the acquired signals into a finite number of coefficients representative of the emitted sound wave; and

- a sub-step ~~(39)~~ for determining spatial and/or sound parameters of the element ~~(3_n)~~ on the basis of the coefficients representative of the emitted sound wave.

5. (currently amended) The ~~A~~ method according to claim 3, ~~characterized in that~~ wherein the calibration sub-step (30) also comprises a sub-step for determining the position in at least one of the three spatial dimensions of the at least one element ~~(3_n)~~ of the reproduction unit ~~(2)~~.

6. (currently amended) The ~~A~~ method according to claim 3, ~~characterized in that~~ wherein the calibration step (30) comprises a sub-step for determining the frequency response ($H_n(f)$) of the at least one element ~~(3_n)~~ of the reproduction unit ~~(2)~~.

7. (currently amended) The ~~A~~ method according to claim 1, ~~characterized in that~~ wherein step ~~(50)~~ for determining adaptation filters comprises:

- a sub-step ~~(54)~~ for determining a decoding matrix (D) representative of filters permitting compensation for the changes in reproduction caused by the spatial characteristics of the reproduction unit ~~(2)~~;

- a sub-step ~~(55)~~ for determining an ideal multi-channel radiation matrix ~~(S)~~ representative of the predetermined general directions associated with each data signal of the plurality of input signals ~~(SI)~~; and

- a sub-step ~~(56)~~ for determining a matrix ~~(A)~~ representative of the adaptation filters using the decoding matrix (D) and the multi-channel radiation matrix ~~(S)~~.

8. (currently amended) The ~~A~~ method according to claim 7, ~~characterized in that~~ wherein the step ~~(50)~~ for determining adaptation filters comprises a plurality of calculation sub-steps ~~(51, 52, 53)~~ permitting the provision of a limit order ~~(L)~~ of the spatial precision of the adaptation filters, a matrix ~~(W)~~ corresponding to a spatial window representative of the distribution in space of the desired precision during the reconstruction of the sound field, and a matrix ~~(M)~~ representative of the radiation of the reproduction unit ~~(2)~~, the sub-step ~~(54)~~ for calculating the decoding matrix ~~(D)~~ being carried out using the results of these calculation sub-steps.

9. (currently amended) The ~~A~~ method according to claim 7, ~~characterized in that~~ wherein the matrices for decoding ~~(D)~~, ideal multi-channel radiation ~~(S)~~ and adaptation ~~(A)~~ are independent of the frequency, step ~~(70)~~ for determining at least one signal for controlling the elements of the reproduction unit by applying the adaptation filters corresponding to simple linear combinations followed by a delay.

10. (currently amended) The ~~A~~ method according to claim 1, ~~characterized in that~~ wherein the step ~~(10)~~ for determining characteristics of the reproduction unit ~~(2)~~ permits the determination of sound characteristics of the reproduction unit ~~(2)~~ and in that the method comprises a step ~~(60)~~ for determining filters for compensating for these sound characteristics, the step ~~(70)~~ for determining at least one control signal then comprising a sub-step ~~(90)~~ for applying the sound compensation filters.

11. (currently amended) The ~~A~~ method according to claim 10, ~~characterized in that~~ wherein the step ~~(10)~~ for determining sound characteristics is suitable for providing parameters representative, in the case of at least one element ~~(3_n)~~, of its frequency response ~~($H_n(f)$)~~.

12. (currently amended) The ~~A~~ method according to claim 1, ~~characterized in that~~ wherein the step ~~(70)~~ for determining at least one control signal comprises a sub-step for adjusting the gain and applying delays in order to align temporally the wavefront of the reproduction elements ~~(3_n)~~ as a function of their distance from the given point ~~(5)~~.

13. (currently amended) The ~~A~~ computer program comprising program code instructions for performing the steps of the method according to claim 1 when the program is performed by a computer.

14. (currently amended) The ~~A~~ removable medium of the type comprising at least one processor and a non-volatile memory element, ~~characterized in that~~ wherein the memory comprises a program comprising code instructions for performing the steps of the method according to claim 1, when the processor performs the program.

15. (currently amended) A device for controlling ~~a sound~~ an acoustic field reproduction unit ~~(2)~~ comprising a plurality of reproduction elements ~~(3_n)~~, comprising ~~input means (112) for a plurality of sound data input signals (SI) each associated with a predetermined general reproduction direction defined relative to a given point (5), characterized in that it also comprises~~:

- means for determining parameters describing the reproduction direction of each channel of a multi-channel audio signal,

- means (116) for determining at least spatial characteristics of the reproduction unit (2), ~~permitting the determination of parameters that are representative, in the case of at least one element (3_n) of the reproduction unit (2), of its position~~ the spatial characteristics comprising at least the direction of each reproduction element in the three spatial dimensions relative to the given point ~~(5)~~,

wherein the determined directions of the reproduction elements are different from the reproduction directions of the multi-channel audio signal,

- means (114) for determining spatial adaptation matrix using the determined directions of the reproduction elements and the parameters describing the reproduction directions, ~~filters (A) using the at least spatial characteristics of the reproduction unit (2) and predetermined general reproduction directions associated with the plurality of sound data input signals (SI) ; and~~

~~- means (114) for determining at least one signal (se_n) for controlling the elements (3_n) of the reproduction unit (2) by applying the adaptation filters (A) to the plurality of sound data input signals (SI)~~

- means for determining a controlling signal for each reproduction element, by applying the adaptation matrix to the multi-channel audio signal,

wherein the spatial adaptation matrix is determined such that controlling the reproduction elements with the controlling signals reproduces, in a region comprising the given point, the acoustic field that would have been obtained by controlling, with the multi-channel audio signal, ideal reproduction elements which would exactly comply with the reproduction directions of the multi-channel audio signal.

16. (currently amended) The ~~A~~ device according to claim 15, ~~characterized in that~~ wherein the means for determining the at least spatial characteristics of the reproduction unit ~~(2)~~ comprise means ~~(116)~~ for the direct acquisition of the characteristics.

17. (currently amended) The ~~A~~ device according to claim 15, ~~characterized in that~~ wherein it is suitable for being associated with calibration means ~~(91, 92, 93, 100)~~ permitting the determination of the at least spatial characteristics of the reproduction unit ~~(2)~~.

18. (currently amended) The ~~A~~ device according to claim 17, ~~characterized in that~~ wherein the calibration means comprise means ~~(100)~~ for acquiring a sound wave which comprise four pressure sensors arranged in accordance with a general tetrahedral shape.

19. (currently amended) The ~~A~~ device according to claim 15, ~~characterized in that~~ wherein the means for determining characteristics are suitable for determining sound characteristics of at least one of the elements ~~(3_n)~~ of the reproduction unit ~~(2)~~, the device comprising means for determining sound compensation filters using the sound characteristics, and the means for determining at least one control signal being suitable for the application of the sound compensation filters.

20. (currently amended) The ~~A~~ device according to claim 19, ~~characterized in that~~ wherein the means for determining the sound characteristics are suitable for determining the frequency response ~~($H_n(f)$)~~ of the elements ~~(3_n)~~ of the reproduction unit ~~(2)~~.

21. (currently amended) An apparatus for processing audio and video data, comprising means ~~(112)~~ for determining a plurality of sound data input signals ~~(SI)~~ each associated with a predetermined general reproduction direction defined by a given point ~~(5)~~, ~~characterized in that~~ wherein it also comprises a device for controlling a reproduction unit ~~(2)~~ according to claim 1.

22. (currently amended) The ~~An~~ apparatus according to claim 21, ~~characterized in that~~ wherein the means for determining a plurality of input signals are formed by a unit ~~(112)~~ for reading and decoding digital audio and/or video discs.

23. (new) The method according to claim 1, wherein the spatial characteristics of the reproduction unit are determined without using the multi-channel audio signal.

24. (new) The method according to claim 1, wherein the spatial adaptation matrix is determined without using the multi-channel audio signal.

25. (new) The device according to claim 1, wherein, when being applied, the spatial adaptation matrix remains as it has been determined.

26. (new) The device according to claim 15, wherein the spatial characteristics of the reproduction unit are determined without using the multi-channel audio signal.

27. (new) The device according to claim 15, wherein the spatial adaptation matrix is determined without using the multi-channel audio signal.

28. (new) The device according to claim 15, wherein, when being applied, the spatial adaptation matrix remains as it has been determined.